

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 11 APR 2006

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Applicant's or agent's file reference AJT/P00669WO	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/GB2005/001131	International filing date (day/month/year) 17.03.2005	Priority date (day/month/year) 18.03.2004	
International Patent Classification (IPC) or national classification and IPC INV. E21B33/138			
Applicant MARCANTONIO, Vincent et al.			

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a. ☒ sent to the applicant and to the International Bureau) a total of 2 sheets, as follows:

☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒ Box No. I Basis of the report

☐ Box No. II Priority

☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability



☐ Box No. IV Lack of unity of invention

☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

☐ Box No. VI Certain documents cited

☐ Box No. VII Certain defects in the international application

☐ Box No. VIII Certain observations on the international application

Date of submission of the demand 17.01.2006	Date of completion of this report 07.04.2006
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer Dantinne, P Telephone No. +31 70 340-3396 

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/GB2005/001131

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-7 as originally filed

Claims, Numbers

1-7 filed with telefax on 17.01.2006

Drawings, Sheets

1/1 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/GB2005/001131

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-7
Inventive step (IS)	Yes: Claims	
	No: Claims	1-7
Industrial applicability (IA)	Yes: Claims	1-7
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V.

- 1 Reference is made to the following documents:

D1: US 6 380 138 B1 (ISCHY NOEL DAVID ET AL) 30 April 2002
D2: US-A-2 728 395 (HOWARD GEORGE C) 27 December 1955
D3: US-A-3 480 079 (JERRY H. GUINN ET AL) 25 November 1969
D4: FR-A-2 122 311 (IFP INSTITUT FS PETROLE; INSTITUT FS PETROLE CARB
LUBRIF,FR) 1 September 1972

2 INDEPENDENT CLAIM 1

- 2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.

Document D3 discloses (see column 4 line 25 - 44):

A diverter for use in multizone stimulation processes comprising a ball consisting essentially of wax with an appropriate melting point, and specific gravity for use in the stimulation process, the wax ball being sized such that it is forced into a perforation in the wall of the well, by the application of pressure, and hence forms a seal.

D3 discloses specifically the use of paraffin beads. Paraffin is a petroleum wax.

The subject-matter of claim 1 is therefore not new (Article 33(2) PCT).

3 INDEPENDENT CLAIM 4

- 3.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 4 is not new in the sense of Article 33(2) PCT.

Document D1 discloses (see column 9 line 1 - 39; column 8 line 30 - 67 and column 5 line 13 - 23):

A method of producing a diverter suitable for use in multizone stimulation processes wherein :

- a) the process used to produce the diverters is an injection moulding process
- b) the material used in the process is essentially wax with or without any necessary diluent, of a melting point and specific gravity appropriate to the intended use; and
- c) the mould cavities defining the shape of the moulded products are ball-shaped and sized to form a ball which fits into a perforation in the wall of a well, by the application of pressure, and hence forms a seal.

4 INDEPENDENT CLAIM 5

- 4.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 5 is not new in the sense of Article 33(2) PCT.

Document D1 discloses (see fig. 1 ; see column 2 line 3 - column 3 line 28; column 5 line 13 - 23):

A multizone stimulation process comprising :

- a) chemically treating an area to improve the flow of oil or gas through rock strata;
 - b) sealing the chemically treated area by insertion under pressure of diverters into the perforations in the wall of the well;
 - c) subsequently releasing the diverters to allow oil to flow;
- wherein the diverters consist essentially of wax (with or without any necessary diluent) balls of an appropriate size, specific gravity and melting point that, on release of the sealing pressure, they melt as they are carried upwards in the oil flow, the wax balls being sized such that it is forced into a perforation in the wall of the well, by the application of pressure, and hence seal the perforations.

5 DEPENDENT CLAIMS 2, 3, 6, 7

**INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(SEPARATE SHEET)**

International application No.

PCT/GB2005/001131

Dependent claims 2, 3, 6, 7 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT) for the following reasons:

Claim 2: D1 discloses the use of other materials to adjust the specific gravity of the ball. (see column 6 line 61 - 64)

Claim 3: D1 discloses spherical diverters (balls)

Claim 6: man skilled in the art will adjust diameter according to perforation size.

Claim 7: contains a reference to the drawings. According to Rule 6.2(a) PCT, claims should not contain such references except where absolutely necessary, which is not the case here.

Note that D1 also discloses a ball with an inner core of binders and wax (see column 5 line 13 - 23). D2 also discloses wax ball sealers (beeswax, carnauba wax,...)

D4 also discloses several type of wax diverters. (see references in search report)

CLAIMS

1. A diverter for use in multizone stimulation processes and characterised in that it comprises a ball consisting essentially of wax with an appropriate melting point, and specific gravity for use in the stimulation process, the wax ball being sized such that it is forced into a perforation in the wall of a well, by the application of pressure, and hence forms a seal.
2. A diverter as claimed in claim 1 comprising wax and an appropriate diluent, wherein the diluent is used to adjust the specific gravity of the ball such that it is at least similar to the specific gravity of the chemical fluids to be used in the stimulation process.
3. A diverter as claimed in either of claim 1 or claim 2 wherein the diverter is spherical.
4. A method of producing a diverter suitable for use in multizone stimulation processes, the method being characterised by the features,
 - a) that the process used to produce the diverters is an injection moulding process;
 - b) that the material used in the process consists essentially of wax (with or without any necessary diluent), of a melting point and specific gravity appropriate to the intended use; and
 - c) that the mould cavities defining the shape of the moulded products are ball-shaped, and sized to form a ball which fits into a perforation in the wall of a well, by the application of pressure, and hence forms a seal.
5. A multizone stimulation process comprising the steps of:
 - a) chemically treating an area to improve the flow of oil or gas through rock strata;
 - b) sealing the chemically treated area by insertion under pressure of diverters into perforations in the wall of a well; and
 - c) subsequently releasing the diverters to allow oil to flow;

characterised by the use of diverters which consist essentially of wax (with or without any necessary diluent) balls of an appropriate size, specific gravity and melting point that, on release of the sealing pressure, they melt as they are carried upwards in the oil flow, the wax balls being sized such that they enter into the perforations in the wall of the well by the application of pressure, and hence seal the perforations.

6. A diverter as claimed in claim 3 wherein the diameter of the spheres are in the range 16mm to 22mm.

7. The invention substantially as described herein with reference to and as illustrated by any appropriate combination of the accompanying drawings.